

REMARKS

Claims 1, 4, 6-7, 13-21, and 25-35 are currently pending. Applicants respectfully request reconsideration and allowance of this application in view of the following comments and the pending claims.

35 U.S.C §103(a)

Claims 1, 4, 6, 7, 13, 19-21 and 25-35 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 7,103,116, Thompson et al ("Thompson") in view of U.S. Patent No. 6,831,957, Chen ("Chen"). Claims 14-18 were rejected under 35 USC 103(a) as being unpatentable over Thompson and Chen, further in view of U.S. Patent Pub. No. 2004/0072547, Axness et al. ("Axness").

Independent claims 1, 7 and 13 are amended; support for the amendment is located in paragraphs [0022] and [0029]. Dependent claim 21 is amended; support for the amendment is located in paragraph [0022] and FIG. 2. Insofar as the rejections may be applied to the amended claims, the rejections are respectfully traversed for reasons including the following, which are provided by way of example.

The specification describes the problem of maintaining a stable output signal volume, and conventional solutions that result in irretrievably losing signal information when saturation occurs (paragraph [0005].) Independent claim 1 recites in combination, for example, "adjustable gain control circuitry for receiving a radio signal and outputting the amplified analog signal using a gain determined by a *magnitude* of the amplified analog signal, the gain being connected directly to the bit signal at an output of the analog-to-digital circuitry;... wherein the gain is adjusted by a first amount responsive to a first bit selected from a *predetermined plurality of most significant bits* in the bit signal, the first bit indicating that the output of the analog-to-digital circuitry has exceeded a first *saturation threshold*, wherein the gain is adjusted by a second amount responsive to a first set of bits selected from the *predetermined plurality of most significant bits* in the bit signal, the first set of

bits indicating that the output of the analog-to-digital circuitry has exceeded a second *saturation threshold*.”

Thereby, the AGC can adjust gain responsive to the magnitude of the signal input to the ADC, prior to the filtering, where the magnitude is determined using the predetermined most significant bits. Accordingly, the gain adjustment can be made directly by the AGC without DSP intervention. (E.g., paragraph [0020].)

The office action contends that Thompson teaches the recited receiver and related method, but admits that Thompson fails to teach how the gain is adjusted. Chen is cited as teaching “that different bit patterns may be utilized to control different levels of gain in such a manner that neither the bit patterns nor the levels of adjustment, that is to say ‘thresholds’, are the same.” The office action particularly relies on Chen, FIG. 4’s state diagram showing four different states of a four-bit register.

Thompson is directed to detecting a false detection of a packet. In short, according to Thompson, “A relatively constant amplitude is achieved by AGC 513 processing the digital samples produced at the output of ADC 518 to product a correction signal to CGI 513a to adjust the degree of amplification. Typically the first 5 or 6 short symbols that are received are used to settle AGC 513 ...” (Col. 7, lines 50-55.)

Chen discloses a digital receiver with dual mode automatic gain control architecture. Chen’s state table of FIG. 4 uses four gain stages implemented with four gain elements (LNA 102, 104, Mixer 106, GCA 112, PGA 114). Four 1-bit registers are used to indicate the status of the gain block, so that the FIG. 4 state table uses various signals scattered about the receiver. (Col. 3, line 63 to Col. 4, line 2.) The examiner contends that it would have been obvious to use Chen’s state table in Thompson because Thompson provides no explicit detail as to how to implement the digital gain changes.

However, even if Chen's state table is implemented in Thompson, there is no reason to select the magnitude of the amplified analog signal, being response to the "predetermined plurality of most significant bits in the bit signal" that indicate a "saturation threshold." To the contrary, combining Chen with Thompson yields Thompson's gain controlled by Chen's dual band low noise amplifiers (LNA 102, 104), down converter 106, IF gain controlled amplifier 112, and programmable gain amplifier 114.

Furthermore, one of ordinary skill in the art would have no reason to modify Thompson in view of Chen to achieve the limitation of adjusting the gain by amounts responsive to the predetermined most significant bits, indicating that a saturation threshold is exceeded. It is important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007). Particularly, the prior art did not appreciate the advantages of using the magnitude of the amplified analog signal to determine the gain, where the gain is connected directly to the bit signal at an output of the analog-to-digital circuitry. The present specification notes the usefulness of this configuration in both an interference test and sensitivity test. (Paragraph [0021].) Without that understanding as disclosed in the specification, there would be no reason to combined Thompson and Chen.

Furthermore, even if Chen's state table is implemented in Thompson, that combination still would not use the predetermined most significant bits from the output of the analog-to-digital circuit to adjust the gain. The examiner seems to contend that one of skill would have simply tried various outputs of various signals and use these in a state table. According to Examination Guidelines for Determining Obviousness under 35 USC 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, to reject a claim based on "Obvious to Try" the examiner must articulate (1) the recognized problem in the art, (2) a

finding that there are a finite number of identified predictable potential solutions to the recognized problem, and (3) a finding that the known potential solutions would have been pursued with a reasonable expectation of success. The office action only makes part of finding (3), that is, that Chen teaches implementing a state table using bits. The office action completely fails to address findings (1) and (2) and part of finding (3). First, where is the recognized problem in the art? Second, Chen uses, as its bits, different signals from the digital radio receiver, and the possible combinations of signals to be swapped with Chen's signals to arrive at the recited combination of most significant bits is huge. Third, why would one of ordinary skill have pursued a state table with which combination of Chen's or Thompson's bits? Because the examiner has not made the proper findings, the claimed invention is not shown to be obvious.

Hence, Thompson and Chen, alone or in combination, fail to teach or suggest the combination of features recited in the independent claims, when considered as a whole.

With respect to the rejected dependent claims, applicants respectfully submit that these claims are allowable not only by virtue of their dependency from the independent claims, but also because of additional features they recite in combination.

For example, claim 21 recites in combination that "the gain is connected directly to the digital representation signal at an output of only one of the two analog-to-digital circuits." None of the references teach or suggest such a configuration.

Applicants respectfully submit that, as described above, the cited art does not show or suggest the combination of features recited in the claims. Applicants do not concede that the cited art shows any of the elements recited in the claims. However, applicants have provided specific examples of elements in the claims that are clearly not present in the cited art.

In view of the foregoing, the applicant submits that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the Examiner is invited to contact the undersigned by telephone.

If there are any problems with the payment of fees, please charge any underpayments and credit any overpayments to Texas Instruments Incorporated's Deposit Account No. 20-0668.

This Amendment is submitted by the undersigned registered patent attorney in accordance with 37 CFR 1.34.

Respectfully submitted,



Cynthia K. Nicholson
Reg. No. 36,880

Texas Instruments Incorporated
P.O. Box 655474
MS 3999
Dallas, TX 75265
Customer No. 23494